

Epoxy-polyamides

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Abstract of GB1016380

A cationic thermosetting resin is produced in three stages: (a) itaconic acid is reacted with an alkylene or arylene diamine; (b) the heterocyclic dibasic acid so produced is reacted with a polyalkylene polyamine and (c) the water-soluble polyamide so produced is reacted with epichlorohydrin. The alkylene or arylene diamine may be ethylene or phenylene diamine, the former giving an acid of structure

<FORM:1016380/C3/1> The diamine may be used in 5% excess over the itaconic acid. In stage (b) polyalkylene polyamines specified are: diethylene triamine, triethylene tetramine, tetraethylene pentamine, pentaethylene hexamine and mixtures thereof. The reaction may be at 110-250 DEG C. atmospheric pressure and the ratio of the reactants such that the primary but not the secondary amino groups are interacted. An alkylene diamine, e.g. ethylene diamine, may also be present. Stage (c) may be at 45-00 DEG C., sufficient epichlorohydrin being used to make all the secondary amine groups tertiary. The product may be diluted with water to 20-30% solids and acidified to a pH below 4. The tertiary amine groups may be quaternized by adding alkyl halides, sulphates or phosphates or substituted alkyl halides. The product may be used to improve the bonding of moisture-proof coatings on non-fibrous, regenerated cellulose film and to produce "wet-strength" in paper. Once absorbed on the paper the resin may be cured under acid neutral or alkaline conditions at elevated temperature. ALSO: A paper having wet-strength is produced by adding a novel epoxy-resin to the paper pulp. The epoxy-resin is produced by (a) reacting itaconic acid with an alkylene or arylene diamine, e.g. ethylene or phenylene diamine, (b) reacting the heterocyclic dicarboxylic acid so formed with a polyalkylene polyamine, e.g. diethylene triamine, triethylene tetra-amine, tetraethylene penta-amine or pentaethylene hexamine, and (c) treating the water-soluble polyamide so formed with epichlorohydrin. It may be further treated with an alkyl halide, sulphate, e.g. dimethyl sulphate, or phosphate to quaternize the nitrogen atoms. 2.5% of the epoxy-resins prepared in the examples are mixed with paper pulp, and the pH adjusted to 7.5 by adding Na₂CO₃. The pulp was then made into paper.

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